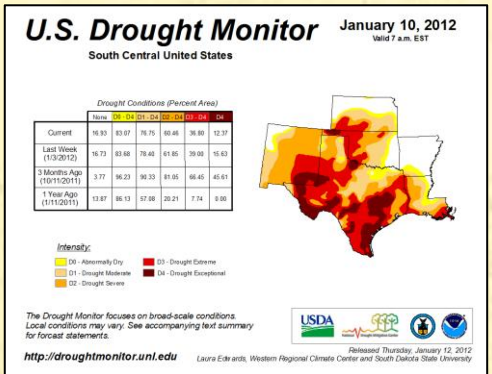
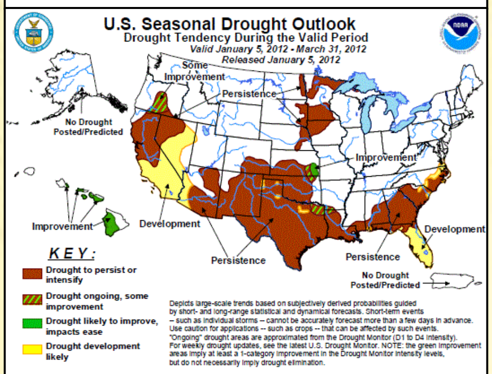
MANAGING DROUGHT
IN THE SOUTHERN PLAINS

Webinar Topic: Seasonal Forecasting
January 12, 2012





Resources

U.S. Drought Portal
http://www.drought.gov

National Drought Mitigation Center
http://drought.unl.edu

Drought Impact Reporter
http://droughtreporter.unl.edu

State Climatologists
http://www.stateclimate.org

Southern Climate Impacts Planning Program (SCIPP)
http://www.southernclimate.org

Climate Assessment for the Southwest (CLIMAS)
http://www.climas.arizona.edu

Southern Plains Portal
http://www.drought.gov/portal/server.pt/community/southern_plains

State Climatologists Review

Texas (John Nielsen-Gammon): Rainfall late in 2011 brought a perception that drought was ending, but reservoir recovery is still lacking. Greatest improvements occurred in the Texas Panhandle and north central Texas. Midland has already set a seasonal snowfall record with a liquid equivalent matching the precipitation total of the first 11 months of 2011.

Oklahoma (Gary McManus): Oklahoma was a land of extremes, setting all-time record 24-hour snowfall (27 inches), lowest temperature (-31 degrees), highest measured wind speed (151 mph from an EF-5 tornado), largest hailstone (6 inches), hottest month (July) and Summer for anywhere in the nation, number of 100-degree days (101), lowest annual precipitation total for a station (6.2 inches), and strongest earthquake (5.5 magnitude).

Kansas (Mary Knapp): The 5th wettest December on record failed to erase much of the deficit, with Kansas recording its 4th driest year on record with record heat in the West. Severe drought is beginning to expand westward again. Meanwhile eastern Kansas experienced record floods with rivers not fully subsiding until October. Wildfire potential remains high.

Missouri (Pat Guinan): Missouri also experienced a range of severe weather, from the Groundhog Day Blizzard to record flooding in April. Topping all of them were tornadoes, including St. Louis' strongest tornado in 40 years and the most devastating U.S. tornado in 60 years that killed 161 in Joplin. This was followed by major Missouri River flooding, drought and the hottest summer since 1980. Fortunately, good, dry weather in October helped with harvesting followed by significant rainfall in November and December.

Colorado (Nolan Doesken): Colorado was split in two – twice. During the spring and summer, very dry weather on the lee side of the Rockies heavily impacted dryland agriculture. But a series of early summer storms lessened the developing drought. However, as fall came, the rains returned in the southeast but the critical snowpack areas in the northwest have been dry.

Regional Drought Summary

Mark Svoboda, National Drought Mitigation Center

A lack of snow and drier conditions have created heightened wildfire potential in the northern plains. Meanwhile, in the southern plains, fall rains brought some spotty relief, most notably in the most severe categories. By no means is the drought over, however, as 77% of the region remains in drought, although the most severe drought categories declined 30-35%. Not much precipitation is forecast with above-normal temperatures returning to the region. The longer-term January-March outlook also shows increased odds of warm, dry weather. This should allow drought to develop in some of the currently drought-free regions in the Southeast.

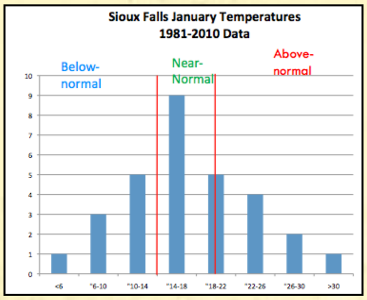
Did You Know?

The NIDIS Portal has a range of forecast products. In the Forecasting Tab, you can find: temperature and precipitation outlooks; soil moisture; hydrology (including stream flow and snow pack); and wildfire potential

Seasonal Forecasting

Presenters:
Dennis Todey – South Dakota State Climatologist
Jon Gottschalck – NOAA Climate Prediction Center
Holly Hartmann – Arid Lands Information Center

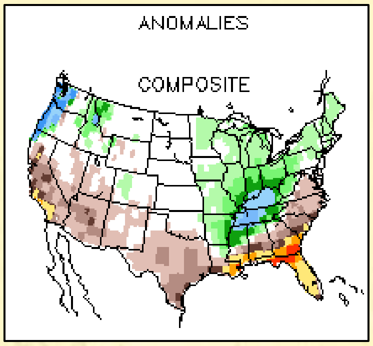
To begin to understand seasonal forecasts, we have to start with normals. Normals are usually an average of weather conditions over a 30-year period. These normals may represent a particular day, month, season or year. However, weather is very rarely normal. Rather, it is usually within some range about that average. This range may be wide, like in spring when weather changes rapidly, or it may be narrow like mid-Summer. Seasonal forecasting projects to which side of this range the temperature or rainfall will lie.



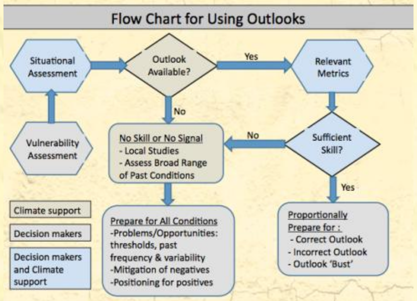
To do this, the 30-year period is broken into thirds, with the highest 10 values being considered above normal, the middle 10 values being near normal, and the lowest 10 values being below normal. The Climate Prediction Center, which issues seasonal outlooks, then tries to predict which of these three categories is most likely. The more confident they are that the total will like in either above or below normal, the higher the value that is depicted on a map. If there are no clear signals to forecast which way it will lie, the CPC shows "EC", or Equal Chances, meaning temperature or rainfall could end up in any one of the categories – there is not enough *skill* to make a forecast. This means an equal 33% chance for each category (the "left over" fraction is usually added to the middle, near normal, category).

A forecast of below or above normal has a number attached to it. For example, a contour (line) showing 40 would mean that there is a 40% chance that the value will be below normal. Because probailities need to add up to 100, 7% is taken away from the above normal category, to make a 40-34-26 percent chance distribution. The higher the confidence of one way or the other, the higher the percentage shown, and consequently, the greater the "odds" of the temperature or precipitation landing in that category. Two things to keep in mind: 1) this is like "loading the dice", it makes an outcome more likely but there is no guarantee, and 2) the cutoff values are dependent upon local climatology, so below-normal may be not far from the average in one location or season compared to another.

The CPC makes forecasts for overlapping 3-month periods out to about a year. You may see a legend on the map saying "valid JFM", for example, which would mean that the outlook is for the months of January, February and March. Each outlook is accompanied by a discussion describing the forecaster's reasoning, such as what influences may be important. The main variables forecasters use are 1) natural climate variability that organizes weather on seasonal time scales, such as El-Nino Southern Oscillation (ENSO), 2) statistical forecasting tools using various methods and data, 3) long-term trends, 4) dynamical weather and climate forecast models, and 5) "boundary conditions" such as soil moisture, ocean temperatures and snow cover. Forecasters look for instances where 3-4 of these techniques may agree to have confidence to make a forecast other than equal chances.



A major challenge for forecasters is that even though there may be relationships in the data, rarely are they near-certain. For example, La Nina may favor warm, dry conditions in the Southern Plains, but it doesn't always behave the same way. In many locations, a clear, consistent relationship may not exist, thus the product cannot shed light. Other confounding factors are atmospheric patterns that shift on less than a seasonal basis, such as the Arctic Oscillation (AO). For example, the northern plains may be warm or cold depending upon the AO phase, even with the same background conditions.



Even wth the difficulties in forecasting, there are times when the forecasts can add important information to help shade decisions and capitalize on likely outcomes or reduce potential losses. To identify these conditions, CLIMAS developed a Forecast Evaluation Tool: (FET) **:** http://fet.hwr.arizona.edu/ForecastEvaluationTool/. The tool lets you look back at seasonal forecasts according to where you are, what season(s) are important to you, and how much lead time you need. For example, if decisions have to be made in September for the upcoming spring, you would want to look at the performance of the 6-month lead time forecasts. The FET takes into account the percentage of time in which a forecast other than equal chances is made and how those forecasts compared to observations when they were issued. If the outlook has a history of showing skill, it allows hedging toward the forecast conditions while still preparing for adverse outcomes, depending upon your wilingness to accept risk. If no skill is indicated, then it may not be wise to use the outlooks; keeping in mind that the outlooks are prepared nationally while there may be some local studies that show skill but are not embedded in the national record.